

Teaching chemistry and
physics to students in the 3rd
curs of ESO, by using the
bilingual educational program
CLIL (*Content and Language
Integrated Learning*)

Additional Material

Index	Page
Unit 6 Exam	356
English Language	
Teacher's Material	364
Student's Material	371
Laboratory Language Support	374
Additional Language	376
Bibliography	
English Language	390
Scientific Information	391
Theory	391
Laboratory Experiments	392
Websites	393

Chemistry Exam  **1**

Unit 6

Date -----

Name -----

Group ----

1.- Identify each of the following changes as either physical or chemical.

Breaking glass
Digestion of food
Growing a plant
Making tea or coffee
Melting Snow

Tearing paper
Rusting Metal
Frying an egg
Toasting bread
Adding salt to boiling water

[1 mark]

2.- Choose the correct answer and give the reason in question 2.1.

2.1.- Which of the following is not an acid?

HCl
NaOH
H₂SO₄
HNO₃
HF

[+ 0.1 mark]

2.2.- When a hydrocarbon combines with oxygen, the chemical reaction is called

Hydrogenation
Combustion
Synthesis
Decomposition
Acid-base

2.3.- What gas is evolved when dilute sulphuric acid is added to zinc?

Argon
Hydrogen
Hydrogen Peroxide
Sulfur Dioxide
Oxygen

2.4.- What do coefficients in a chemical reaction tell us about a substance?

Height
Mass-Mass ratio
Molar ratio
Weight
Area

2.5.- What are the compounds on the left side of the → called?

Reactants
Particles
Moles
Radicals
Products

2.6.- What are the compounds to the right of the → called?

Reactants
Particles
Moles
Radicals
Products

2.7.- What do the letters (aq) stand for in a Mass-Mass problem?

- Acute
- Liquid
- Solid
- Aqueous
- Gas

[0.8 marks]

3. In the chemical equation: $\text{CaCO}_{3(s)} + 2 \text{HCl}_{(aq)} \rightarrow \text{CaCl}_{2(aq)} + \text{CO}_{2(g)} + \text{H}_2\text{O}_{(l)}$

a. Name the elements, and tell the number of atoms that are in every compound.

[0.5 marks]

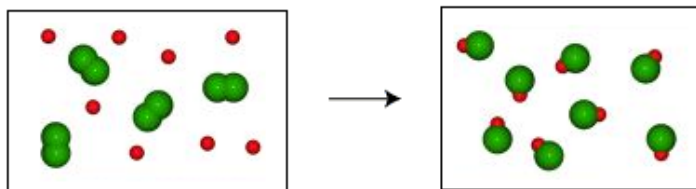
b. Count the total number of atoms of each element that are in the reactants and products. Is it the same number?

[0.6 marks]

c. Choose the correct words (in bolds) in the following paragraph to make a sentence related to balance of chemical equations: In a **chemical/physical** reaction, the number of each type of atom is **the same/different** on the left and right sides of the equation, the **atoms/molecules** have only reordered.

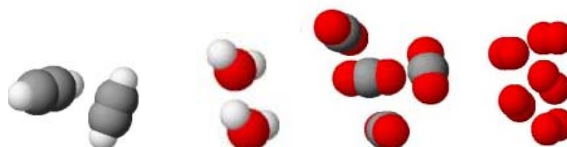
[0.6 marks]

4.- Justify if the following diagram is a chemical or a physical change:



[0.6 marks]

5.- In combustion of acetylene (C_2H_2) (reaction with oxygen), carbon dioxide and water are produced. Molecules of the four substances that participate in the combustion are represented by:



a. Write the balanced equation.

[1 mark]

b. Match each formula with their molecular diagram.

[0.6 marks]

6.- Tell, giving reasons, if the following equations are endothermic or exothermic chemical reactions :

a. **Photosynthesis:** $\text{sunlight} + 6\text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{C}_6\text{H}_{12}\text{O}_6(\text{aq}) + 6\text{O}_2(\text{g})$ [0.4 marks]

b. $\text{Na}(\text{s}) + 0.5\text{Cl}_2(\text{s}) \rightarrow \text{NaCl}(\text{s}) + 411 \text{ kJ mol}^{-1}$ [0.4 marks]

7.- Balance the following equation. $\text{___ CoO} + \text{___ O}_2 \rightarrow \text{___ Co}_2\text{O}_3$ [0.9 marks]

8.- When iron oxidized, its mass increases. What is the reason? [0.8 marks]

9.-

a. What is the atomic mass of aluminium chloride?

b. How many moles of aluminium chloride are formed by the reaction of 1.50 mol of HCl according to the following equation: $2\text{Al}_{(s)} + 6\text{HCl}_{(aq)} \rightarrow 2\text{AlCl}_{3(aq)} + 3\text{H}_{2(g)}$?

c. Calculate the mass of aluminium chloride obtained in part b. [1.8 marks]

Chemistry Exam 2

Unit 6

Date -----

Name -----

Group -----

1.-

a. In a sentence, explain why melting ice is a physical change and not a chemical change.

b. When you digest a meal, you take in food. The food gets changed with enzymes (digestive chemicals) into different types of molecules which your cells can use. Is digestion a chemical reaction or a physical change? Explain your answer.

c. A chemist added two clear, cold liquid substances together in a clear container. He stared at the container. No change in colour. He stirred it. There was no solid matter in the bottom. It looked just the same as it had before. He started to pick it up, and suddenly dropped it, saying, "Ow, that's hot!" and running for some ice for his hand. Did a reaction happen or not? Explain your answer. [1.2 marks]

2.- Fill in the missing word:

a. Acid + _____ → Salt + Water

b. An equation must be _____ in order for it to be complete.

c. The left side of the equation contains the _____

d. The right side of the equation contains the _____

e. A balanced equation shows the same number of atoms of each _____ on each side. [1 mark]

3.- List what type the following reactions are: combustion, synthesis, acid-base, single displacement, double displacement, decomposition. Give the reasons for your choice.

a. $\text{NaOH} + \text{KNO}_3 \rightarrow \text{NaNO}_3 + \text{KOH}$

b. $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$

c. $2 \text{Fe} + 6 \text{NaBr} \rightarrow 2 \text{FeBr}_3 + 6 \text{Na}$

d. $\text{CaSO}_4 + \text{Mg}(\text{OH})_2 \rightarrow \text{Ca}(\text{OH})_2 + \text{MgSO}_4$

e. $\text{NH}_4\text{OH} + \text{HBr} \rightarrow \text{H}_2\text{O} + \text{NH}_4\text{Br}$

f. $\text{Pb} + \text{O}_2 \rightarrow \text{PbO}_2$

g. $\text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{O} + \text{CO}_2$

h. $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

i. $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$

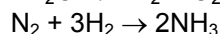
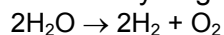
j. $2\text{NaI} + \text{F}_2 \rightarrow 2\text{NaF} + \text{I}_2$

k. $2\text{AgCl} + \text{BaBr}_2 \rightarrow 2\text{AgBr} + \text{BaCl}_2$

l. $\text{C}_2\text{H}_6 + 5\text{O}_2 \rightarrow 3\text{H}_2\text{O} + 2\text{CO}_2$ [1.2 marks]

4.-

a. How many atoms of hydrogen are on the left side of the following reactions?



[0.3 marks]

b. How many atoms of hydrogen are on the reactant side of the previous reactions? [0.3 marks]

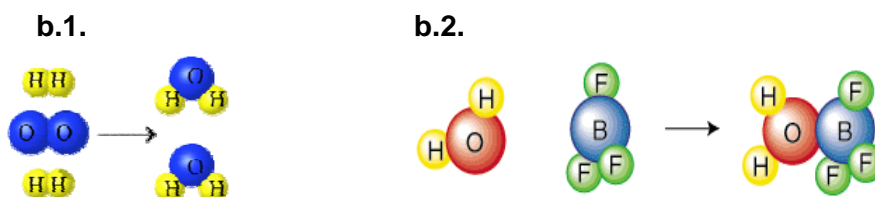
c. Choose the correct words (in bolds) in the following paragraph to make a sentence related to balance of chemical equations: In a **chemical/physical** reaction, the number of each type of atom is **the same/different** on the left and right sides of the equation, the **atoms/molecules** have only reordered. [0.4 marks]

5.-

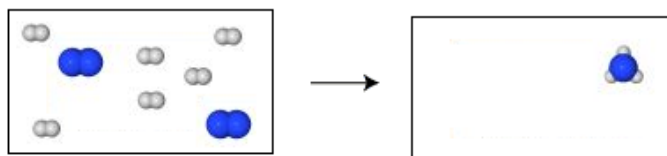
a) Balance the following equations and write the names of the reactants and products:

- 1) $\underline{\hspace{1cm}} \text{NH}_3(\text{g}) \rightarrow \underline{\hspace{1cm}} \text{N}_2(\text{g}) + \underline{\hspace{1cm}} \text{H}_2(\text{g})$
- 2) $\underline{\hspace{1cm}} \text{PbO}_2(\text{s}) + \underline{\hspace{1cm}} \text{HCl}(\text{aq}) \rightarrow \underline{\hspace{1cm}} \text{PbCl}_2(\text{aq}) + \underline{\hspace{1cm}} \text{Cl}_2(\text{aq}) + \underline{\hspace{1cm}} \text{H}_2\text{O}(\text{l})$
- 3) $\underline{\hspace{1cm}} \text{Cu}(\text{s}) + \underline{\hspace{1cm}} \text{O}_2(\text{s}) \rightarrow \underline{\hspace{1cm}} \text{Cu}_2\text{O}(\text{s})$
- 4) $\underline{\hspace{1cm}} \text{H}_2(\text{g}) + \underline{\hspace{1cm}} \text{O}_2(\text{g}) \rightarrow \underline{\hspace{1cm}} \text{H}_2\text{O}(\text{l})$
- 5) $\underline{\hspace{1cm}} \text{Ca}(\text{OH})_2(\text{s}) + \underline{\hspace{1cm}} \text{HCl}(\text{aq}) \rightarrow \underline{\hspace{1cm}} \text{CaCl}_2(\text{aq}) + \underline{\hspace{1cm}} \text{H}_2\text{O}(\text{l})$
- 6) $\underline{\hspace{1cm}} \text{CH}_4(\text{g}) + \underline{\hspace{1cm}} \text{O}_2(\text{g}) \rightarrow \underline{\hspace{1cm}} \text{H}_2\text{O}(\text{l}) + \underline{\hspace{1cm}} \text{CO}_2(\text{g})$ [1.1 marks]

b. What do the following diagrams mean? [0.3 marks]



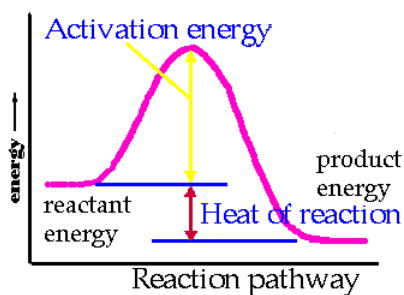
c. Complete the following diagram where the blue spheres represent atoms of nitrogen and the grey spheres atoms of hydrogen: [0.3 marks]



d. Which chemical reaction is represented in the previous diagram? [0.4 marks]

6.-

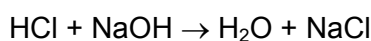
a. Looking at the following diagram, tell if the reaction will be endothermic or exothermic. Explain the reason. [0.6 marks]



b. Draw a diagram for the opposite reaction. [0.4 marks]

7.- How many moles of aluminium chloride are formed by the reaction of 1.50 mol of HCl according to the following equation: $2\text{Al}(\text{s}) + 6\text{HCl}(\text{aq}) \rightarrow 2\text{AlCl}_3(\text{aq}) + 3\text{H}_2(\text{g})$ [1 mark]

8.- How many grams of NaCl will be produced when 22.85 g of HCl are neutralized by an excess of NaOH according to the equation below? [1.5 marks]



Chemistry Exam **a** **3**

Unit 6

Group -----

Name -----

Date -----

1.-

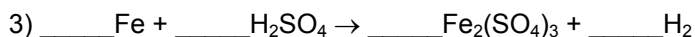
a. In a sentence, explain why melting ice is a physical change and not a chemical change.

b. When you digest a meal, you take in food. The food gets changed with enzymes (digestive chemicals) into different types of molecules which your cells can use. Is digestion a chemical reaction or a physical change? Explain your answer.

c. A chemist added two clear, cold liquid substances together in a clear container. He stared at the container. No change in colour. He stirred it. There was no solid matter in the bottom. It looked just the same as it had before. He started to pick it up, and suddenly dropped it, saying, "Ow, that's hot!" and running for some ice for his hand. Did a reaction happen or not? Explain your answer. [1.2 marks]

2.

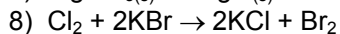
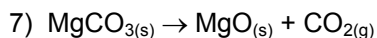
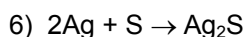
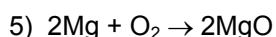
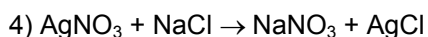
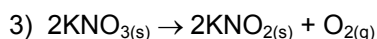
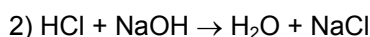
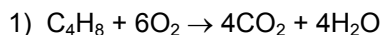
a. Balance the following chemical equations.



[1 mark]

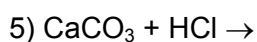
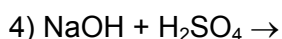
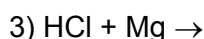
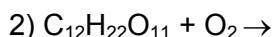
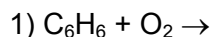
b. Choose the correct words (in bolds) in the following paragraph to make a sentence related to balance of chemical equations: In a **chemical/physical** reaction, the number of each type of atom is **the same/different** on the left and right sides of the equation, the **atoms/molecules** have only reordered. [0.4 marks]

3. Identify the following chemical equations by type (combustion, synthesis, etc.)



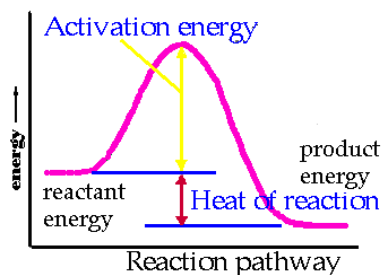
[1.6 marks]

4.- Write correct formulas for the products in the following reactions and balance the equations: [2 marks]



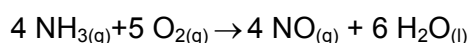
5.-

a. Looking at the following diagram, tell if the reaction will be endothermic or exothermic. [0.6 marks]

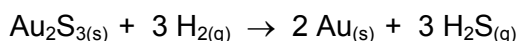


b. Draw a diagram for the opposite reaction. [0.4 marks]

6.- How many grams of NO can be produced from 0.68 g of NH₃ according to the following reaction? [1 mark]



7.- Solid gold is produced when gold (III) sulphide reacts with hydrogen gas. 85.0 g of gold (III) sulphide is mixed with 85.0 g of hydrogen gas. Which substance will react completely (limiting reactant)? Give the reasons. The equation for this reaction is as follows: [1.2 marks]



8.- What is oxidized in the following reaction: $\text{H}_3\text{AsO}_4(\text{aq}) + \text{Zn}(\text{s}) \rightarrow \text{AsH}_3(\text{g}) + \text{Zn}^{2+}(\text{aq})$ Why? [0.6 marks]



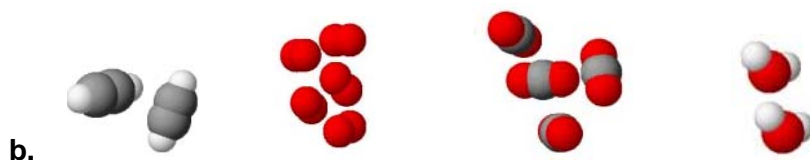
Solutions

Chemistry Exam **R** 1

- 1.-
- | | |
|--------------------------|----------------------------------|
| Breaking glass (P) | Tearing paper (P) |
| Digestion of food (C) | Rusting Metal (C) |
| Growing a plant (C) | Frying an egg (C) |
| Making tea or coffee (P) | Toasting bread (C) |
| Melting Snow (P) | Adding salt to boiling water (P) |

- 2.-
- 2.1.- NaOH
 - 2.2.- Combustion
 - 2.3.- Hydrogen
 - 2.4.- Molar ratio
 - 2.5.- Reactants
 - 2.6.- Products
 - 2.7.- Aqueous

3. c. In a **chemical** reaction, the number of each type of atom is **the same** on the left and right sides of the equation, the **atoms** have only reordered.



6.-

- a. **endothermic**
- b. **exothermic**



8.- **It reacts with oxygen (oxygen is added)**

9.-

- a. **27**
- b. **0.5 moles**
- c. **66.75 g**

Chemistry Exam 2

1.-

- b. **Chemical reaction.**
- c. **A reaction happen.**

2.-

- a. **Base**
- b. **Balanced**
- c. **Reactants**
- d. **Products**
- e. **Elements**

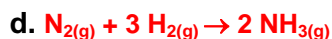
3.-

- a. **Double displacement**
- b. **Combustion**
- c. **Single displacement**
- d. **Double displacement**
- e. **Acid-base**
- f. **Synthesis**
- g. **Decomposition**
- h. **Synthesis**
- i. **Decomposition**
- j. **Single displacement**
- k. **Double displacement**
- l. **Combustion**

4.- c. In a **chemical** reaction, the number of each type of atom is **the same** on the left and right sides of the equation, the **atoms** have only reordered

5.- a.

- 1) $2 \text{NH}_3(\text{g}) \rightarrow \text{N}_2(\text{g}) + 3 \text{H}_2(\text{g})$
- 2) $\text{PbO}_2(\text{s}) + 4 \text{HCl}(\text{aq}) \rightarrow \text{PbCl}_2(\text{aq}) + \text{Cl}_2(\text{aq}) + 2 \text{H}_2\text{O}(\text{l})$
- 3) $4 \text{Cu}(\text{s}) + \text{O}_2(\text{s}) \rightarrow 2 \text{Cu}_2\text{O}(\text{s})$
- 4) $2 \text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2 \text{H}_2\text{O}(\text{l})$
- 5) $\text{Ca}(\text{OH})_2(\text{s}) + 2 \text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + 2 \text{H}_2\text{O}(\text{l})$
- 6) $\text{CH}_4(\text{g}) + 2 \text{O}_2(\text{g}) \rightarrow 2 \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$



6.- a. **Exothermic**

7.- **0.5 moles**

8.- **36.62 g**

Chemistry Exam **a** **3**

2. a.

- 1) $3 \text{Mg} + \text{N}_2 \rightarrow \text{Mg}_3\text{N}_2$
- 2) $2 \text{KNO}_3 \rightarrow 2 \text{KNO}_2 + \text{O}_2$
- 3) $2 \text{Fe} + 3 \text{H}_2\text{SO}_4 \rightarrow \text{Fe}_2(\text{SO}_4)_3 + 3 \text{H}_2$

b. In a **chemical** reaction, the number of each type of atom is **the same** on the left and right sides of the equation, the **atoms** have only reordered

3.

- 1) **Combustion**
- 2) **Acid-base**
- 3) **Decomposition**
- 4) **Double displacement**
- 5) **Synthesis**
- 6) **Synthesis**
- 7) **Decomposition**
- 8) **Single displacement**

4.-

- 1) $2 \text{C}_6\text{H}_6 + 15 \text{O}_2 \rightarrow 12\text{CO}_2 + 6 \text{H}_2\text{O}$
- 2) $\text{C}_{12}\text{H}_{22}\text{O}_{11} + 12 \text{O}_2 \rightarrow 12\text{CO}_2 + 11 \text{H}_2\text{O}$
- 3) $2 \text{HCl} + \text{Mg} \rightarrow \text{MgCl}_2 + \text{H}_2$
- 4) $2 \text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2 \text{H}_2\text{O}$
- 5) $\text{CaCO}_3 + 2 \text{HCl} \rightarrow \text{CaCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$

5.- a. **Exothermic**

6.- **1.2 g**

7.- **Gold (III) sulphide.**

8.- **Zn**

ENGLISH LLENGUATGE

TEACHER'S MATERIAL

The beginning of the lesson

1. Good morning

- Good morning, everybody.
- Good afternoon, everybody.
- Hello, everyone.
- Hello there, James.

2. How are you?

- How are you today, ...?.
- How are you getting on?
- How's life?
- How are things with you, ...?
- Are you feeling better today, Bill?

3. Introductions

- My name is Mr/Mrs/Ms Kim. I'm your new English teacher.
- I'll be teaching you English this year.
- I've got five lessons with you each week.

4. Time to begin

- Let's begin our lesson now.
- Is everybody ready to start?
- I hope you are all ready for your English lesson.
- I think we can start now.
- Now we can get down to work.

5. Waiting to start

- I'm waiting for you to be quiet.
- We won't start until everyone is quiet.
- Stop talking and be quiet.
- Settle down now so we can start.

6. Put your things away

- Close your books.
- Put your books away.
- Pack your things away.

7. Register

- Who is absent today?.
- Who isn't here today?
- What's the matter with ... today?
- What's wrong with Jim today?
- Why were you absent last Friday, ...?

8. Late

- Where have you been?
- We started ten minutes ago. What have you been doing?.
- Did you miss your bus?
- Did you oversleep?
- Don't let it happen again.

Simple instructions

- Come in.
- Go out.
- Stand up.
- Sit down.
- Come to the front of the class. Stand by your desks.
- Put your hands up.
- Put your hands down.
- Hold your books/pens up.
- Show me your pencil.

The following instructions can be used at the beginning of a session:

- Pay attention, everybody.
- You need pencils/rulers.
- We'll learn how to ...
- Are you ready?
- Open your books at page ...
- Turn to page ...
- Look at activity five. Listen to this tape.
- Repeat after me.
- Again, please.
- Everybody ...
- You have five minutes to do this.
- Who's next?
- Like this, not like that.

The following instructions can be used at the end of a session:

- It's time to finish.
- Have you finished?
- Let's stop now.
- Stop now.
- Let's check the answers. Any questions?
- Collect your work please.
- Pack up your books.
- Are your desks tidy?
- Don't forget to bring your ... tomorrow.

Instructions can also be sequenced:

- First
- Next
- After that Then
- Finally

Comprehension language:

- Are you ready?
- Are you with me?
- Are you OK?
- OK so far?
- Do you get it?
- Do you understand?
- Do you follow me? What did you say?
- One more time, please.
- Say it again, please.
- I don't understand.
- I don't get it.

- Like this?
- Is this OK?

The end of the lesson

1. Time to stop

- It's almost time to stop.
- I'm afraid it's time to finish now.
- We'll have to stop here.
- There's the bell. It's time to stop.
- That's all for today.
- You can go now.

2. Not time to stop.

- The bell hasn't gone yet.
- There are still two minutes to go.
- We still have a couple of minutes left.
- The lesson doesn't finish till five past.
- Your watch must be fast.
- We seem to have finished early.
- We have an extra five minutes.
- Sit quietly until the bell goes.

3. Wait a minute

- Hang on a moment.
- Just hold on a moment.
- Stay where you are for a moment.
- Just a moment, please.
- One more thing before you go.
- Back to your places.

4. Next time

- We'll do the rest of this chapter next time.
- We'll finish this exercise next lesson.
- We've run out of time, so we'll continue next lesson.
- We'll continue this chapter next Monday.

5. Homework

- This is your homework for tonight.
- Do exercise 10 on page 23 for your homework.
- Prepare the next chapter for Monday.
- There is no homework tonight.
- Remember your homework.
- Take a worksheet as you leave.

6. Goodbye

- Goodbye, everyone.
- See you again next Wednesday.
- See you tomorrow afternoon.
- See you in room 7 after the break.
- Have a good holiday.
- Enjoy your vacation..

7. Leaving the room

- Get into a queue.
- Form a queue and wait for the bell.
- Everybody outside!
- All of you get outside now!
- Hurry up and get out!
- Try not to make any noise as you leave.
- Be quiet as you leave. Other classes are still working.

Spontaneous situations

- Happy birthday!
- Many returns (of the day).
- has his/her 12th birthday today.
- ... is eleven today. Let's sing "Happy Birthday".

- I hope you all have a good Christmas.
- Happy New Year!
- All the best for the New Year.
- Happy Easter.

- Best of luck.
- Good luck.
- I hope you pass.
- Congratulations!
- Well done!

- Hard lines!
- Never mind.
- Better luck next time..

- Who's not here today?
- Who isn't here?
- What's wrong with ... today?

- Do you feel better today?
- Are you better now?
- Have you been ill?
- What was the matter?

- I'm sorry (about that).
- Sorry, that was my fault.
- I'm terribly sorry.

- Excuse me for a moment.
- I'll be back in a moment.
- Carry on with the exercise while I'm away.
- I've got to go next door for a moment.

- Excuse me.
- Could I get past please?
- You're blocking the way.
- I can't get past you.
- Get out of the way, please.

- I'm afraid I can't speak any louder.
- I seem to be losing my voice.
- I have a sore throat.
- I have a headache.
- I'm feeling under the weather.
- Do you mind if I sit down?

Classroom management

- Make groups of four.
- Move your desks into groups of four people.
- Turn your desks around.
- Make a horseshoe shape with your desks.

- Make a circle with your desks.
- Make a line of desks facing each other.
- Make groups of four desks facing each other.
- Sit back to back.
- Work together with your friend
- Find a partner
- Work in pairs/threes/fours/fives.
- Work in groups of two/three/four.
- I want you to form groups.
- Form groups of three
- Here are some tasks for you to work on in groups of four.
- There are too many in this group.
- Can you join the other group?
- Only three people in each group.
- I asked for four people to a group.
- Everybody work individually
- Work by yourselves.
- Work independently.
- Ask your neighbour for help.
- Work on the task together.
- Ask other people in the group
- Ask others in the class.
- Interview someone else.
- Ask everyone in the class.
- Stand up and find another partner.
- Have you finished?
- Do the next activity.
- Move on to the next activity.

Organization

Giving instructions

- Open your books at page 52
- Come out and write it on the board
- Listen to the tape, please
- Get into groups of four
- Finish off this song at home
- Let's sing a song.
- Everybody, please.
- All together now.
- The whole class, please.
- I want you all to join in
- Could you try the next one?
- I would like you to write this down.
- Would you mind switching the lights on?
- It might be an idea to leave this till next time.
- Who would like to read?
- Which topic will your group report on?
- Do you want to answer question 3?

Sequencing

- First of all, today, ...
- Right. Now we will go on to the next exercise.
- Have you finished?
- For the last thing today, let's ...
- Whose turn is it to read?

- Which question are you on?
- Next one, please.
- Who hasn't answered yet?
- Let me explain what I want you to do next.
- The idea of this exercise is for you to ...
- You have ten minutes to do this.
- Your time is up.
- Finish this by twenty to eleven.
- Can you all see the board?
- Have you found the place?
- Are you all ready?

Supervision

- Look this way.
- Stop talking.
- Listen to what ... is saying.
- Leave that alone now.
- Be careful.

Interrogation

Asking questions

- Where's Min-su?
- Is Min-su in the kitchen?
- Tell me where Min-su is.
- What was the house like?
- What do you think?
- How can you tell?

Responding to questions

- Yes, that's right
- Fine.
- Almost. Try again.
- What about this word?

Explanation

Metalanguage

- What's the Korean for "doll"?
- Explain it in your own words.
- It's spelt with a capital "J".
- Can anybody correct this sentence?
- Fill in the missing words.
- Mark the right alternative.

Reference

- After they left the USA, the Beatles ...
- The church was started in the last century.
- This is a picture of a typically English castle.
- In the background you can see ...
- While we're on the subject, ...
- As I said earlier, ...
- Let me sum up.

Interaction

Affective attitudes

- That's interesting!
- That really is very kind of you.
- Don't worry about it.
- I was a bit disappointed with your efforts.

Social ritual

- Good morning.
- Cheerio now.
- God bless!
- Have a nice weekend.
- Thanks for your help
- Happy birthday!
- Merry Christmas!

The language of error correction

- Very good
- That's very good
- Well done
- Very fine
- That's nice
- I like that
- Marvellous You did a great job.
- Magnificent
- Terrific
- Wow!
- Jolly good
- Great stuff
- Fantastic Right
- Yes
- Fine
- Quite right
- That's right.
- That's it.
- That's correct
- That's quite right.
- Yes, you've got it.
- You've got the idea.
- It depends
- It might be, I suppose
- In a way, perhaps
- Sort of , yes.
- That's more like it
- That's much better
- That's a lot better
- You've improved a lot Not really
- Unfortunately not
- I'm afraid that's not quite right
- You can't say that, I'm afraid
- you can't use that word here
- Good try, but not quite right

- Have another try
- Not quite right. Try again.
- Not exactly You were almost right.
- That's almost it
- You're halfway there
- You've almost got it
- You're on the right lines
- There's no need to rush
- There's no hurry
- We have plenty of time
- Go on. Have a try
- Have a go
- Have a guess
- There's nothing wrong with your answer.
- What you said was perfectly all right.
- You didn't make a single mistake.
- That's exactly the point.
- That's just what I was looking for. Don't worry about your pronunciation.
- Don't worry about your spelling.
- Don't worry, it'll improve
- Maybe this will help you
- Do you want a clue (hint)?
- You have good pronunciation.
- Your pronunciation is very good.
- You are communicating well.
- You speak very fluently.
- You have made a lot of progress. You still have some trouble with pronunciation.
- You need more practice with these words.
- You'll have to spend some time practising this.
- You're getting better at it all the time.
- You've improved no end.

STUDENT'S MATERIAL

Explaining exploratory, hypothetical and speculative talk

- What if ...
- Supposing ...
- Imagine if ...
- Why would ...
- Perhaps ...
- Maybe ...
- Could be ...
- It might be that ...
- I wonder if ...
- What about ...
- It's possible that ...
- It's probable that ...

Explaining cause and effect

- The result is ...
- Consequently ...
- This result in ...
- As a result ...
- Precipitating ...
- Initiating ...

- Triggering ...
- The effect of this is ...
- As a consequence ...
- Inevitably ...
- This, in turn, causes ...

Chronological key words

- Yesterday, we went ...
- First we ...
- Next, we ...
- After that, we ...
- Then ...
- Finally ...
- I already knew that ...
- I have learned that ...
- I also learned that ...
- Other facts I learned are ...
- The most interesting thing I discovered as that ...
- Now, I know that ...

Comparing two contrasting things

- They both have ...
- They are similar in that ...
- The ... resembles ...
- They are different in some ways ...
- While...
- Although ...
- As well as...
- In addition to ...
- Another difference is that ...

Explanations

Temporal conjunctions

- First ...
- To begin with ...
- After this ...
- Later ...
- Finally ...

Causal conjunctions

- Because ...
- Therefore ...
- Thus ...
- It follows that ...

Frames

- I want to explain why ...
- There are several reasons for this ...
- The first reason is ...
- Another reason is ...
- A further reason is ...
- Now you can see why ...
- I want to explain how ...
- To begin with, it ...
- And this means / changes to ...

- After that ...
- As a result of this ...
- Next ..
- Then ...
- The final result is that ...
- One explanation fir this is ...
- An alternative explanation might be ...

Instructions

Procedure

- First, ...
- The, ...
- Next, ...
- Finally ...

Persuasion

- Although not everyone thinks the way I do, I want to argue that ...
- I have several reasons for thinking this. My firts is that ...
- A further reason is ...
- Also, ...
- Furthermore, ...
- Therefore, although some people think that ...
- I think I have explained why ...
- I think that because ...
- The reasons I think this are, firstly ...
- Secondly, ...
- Another reason is that ...
- Moreover, ...
- In conclusion, ...

Discussion

- Some people think that because ...
- They argue that ...
- Other people who agree with this point of view are ...
- They think that ... because ...
- On the other hand, disagree with the idea that ... because ...
- They feel that ...
- They also say ...
- I agree with because I think that ...
- Some people claim that ...
- Another viewpoint / standpoint is ...
- A further point they make is ...
- Furthermore, they claim that ...
- After weighing up all the evidence, ...
- In conclusion, ...

LABORATORY LANGUAGE SUPPORT

Before doing an experiment report, consult the following sheets

Scientific Investigation Planning Sheet

What are you trying to find out?

I am trying to find out

How are you going to find out? Write a method for your experiment here and draw a diagram.

First of all I will

Next

Then I will ...

I will measure/ observe ...

I will need ...

How will you make your experiment a fair test?

The things I will keep the same are

What do you think will happen in your experiment?

I think that ...

Why will this happen? (Try to give a scientific explanation)

This will happen because

Scientific Investigation Results Sheet

What happened in your experiment? You may need to make a table of results. Use a separate sheet for a graph if you can draw one. You may need to draw diagrams of what you observed, or explain carefully what happened.

Were you correct about what would happen? (Remember what you said in the "What do you think will happen?" box)

Explain your results in as much detail as you can. You may draw diagrams if it will help your scientific explanation. Go onto a separate piece of paper if necessary. Why did you get the answers you did?

Is there any way you could have improved your experiment?

First ...	We found out that ...	Then I will ...	I think that ...	I am going to explain ...
------------------	------------------------------	------------------------	-------------------------	----------------------------------

My idea is good because ...	Next ...	The step is to ...	I will measure ...	I will observe ...
------------------------------------	-----------------	---------------------------	---------------------------	---------------------------

To make my experiment safe ...	I must make sure ...	We will need to record ...	I predict that ...	These results show ...
---------------------------------------	-----------------------------	-----------------------------------	---------------------------	-------------------------------

The pattern we found ...	Some results did not fit the pattern ...	I am trying to prove ...	The equipment we will need ...	My partner's idea is ...
---------------------------------	---	---------------------------------	---------------------------------------	---------------------------------

Our observations show ...	This explains ...	In conclusion ...	We needed to make some improvements ...	We did not collect enough ...
----------------------------------	--------------------------	--------------------------	--	--------------------------------------

ADDITIONAL LANGUAGE⁵

A frame to discuss / debate

Introduction

The issue we are discussing is ...	The issue of concern is that of ...
There are different ideas around the issue of ...	The issue of (<i>the issue</i>) raises a lot of discussion and people have very different opinions about it ...
It is my intention to provide all sides of the argument around ...	To help you make up your mind about the issue of (<i>the issue</i>) I would like to present both sides of the argument, that is ...
Although not everyone agrees with the issue of ... I want to present the points of view that surrounds this ...	

Second paragraph

The people who agree with this idea claim that ...	Some people think that ...
Beginning with those arguments in support of (<i>the issue</i>) ...	In support of (<i>the issue</i>) people believe ...

⁵ Teacher will provide some of these cards to students, when he thinks are suitable.

First of all consider the points in favour of (<i>the issue</i>) ...	Those who agree (<i>the issue</i>) with say that ...
---	---

Third paragraph

Furthermore ...	They also argue that ...
Also the supporters of (<i>the issue</i>) believe that ...	In addition ...
Further evidence used to support the idea for (<i>the issue</i>) is ...	

Fourth / fifth paragraph

Not everyone supports this and believe that ...	On the other hand ...
Despite these arguments there are people who believe otherwise ...	In opposition to these beliefs are those who think ...

However there are strong arguments against this point of view ...	Conversely ...
Other people think ...	

Conclusion

After looking at the different points of view and the evidence for them ...	I think that ...
You may not agree with my belief that ...	Looking at all the evidence it is my belief that ...
After weighing up both sides of the argument I have come to the conclusion that ...	On reflection ...
My conclusion, based on this evidence is that ...	I hope that the supporting evidence of both points of view has allowed you to come to an informed decision about ...

A frame to recount / retell

Introduction

Before I began this topic I thought that ...	To begin ...
Initially ...	Prior to ...
Although I already knew that ...	Looking back ...
Yesterday ... Over the last week / month / year Some time ago	Previous to my experience / research I had been of the opinion that ...

Second paragraph

First of all ...	I found out that ...
In order to find out more I ...	My first point ...

I have learnt several interesting facts that support my understanding, the first being ...	With this knowledge in mind I ...
From this point I investigated ...	As I read more / investigated I found out that ...

Third paragraph

Additionally ...	Following this ...
As a result of ...	Later ...
Another point of interest ...	Confirming my initial opinion of / about (<i>subject</i>) was ...
During ...	

Fourth paragraph

On the other hand ...	Subsequently ...
I was surprised to find out that ...	As I said previously ...
Furthermore ...	Other information that I believe to be important ...
Essentially ...	My opinion was changed when I found out that ...
Besides ...	

Fifth paragraph

My final point is ...	Consequently ...
Finally ...	

Conclusion

As you can see ...	I have learnt ...
I now know ...	To summarize ...
In conclusion ...	On reflection ...
To evaluate what I have learnt ...	The most interesting piece of new information is ...
I now think that ...	

A frame to explain

Introduction

I want to explain ...	(The issue) ... happens when ...
------------------------------	---

There are different explanations as to ...	The question of ... requires a full explanation of the facts surrounding the issue.
To better understand ... it is necessary to examine ...	

Second paragraph

It starts by/with ...	First of all ...
There are several reasons for this, the first being ...	Importantly ...
The chief reason to explain ...	One explanation of ...
It is believed/understood that ...	My first point is ...
To begin with ...	

Third paragraph

In addition ...	The facts of the matter reveal ...
Furthermore ...	After that ...
Influenced by ...	My second point is ...
The result of ... meant ...	Because of ...
Another reason is ...	

Fourth paragraph

Besides ...	As well as ...
Alternatively ...	As a result of ...

Further evidence supports ...	The effects of ...
Moreover ...	In order to ...
Another reason ...	

Fifth paragraph

However ...	On the other hand ...
The evidence for ...	After ...
Subsequently ...	In other words ...
Also ...	

Conclusion

Finally ...	So, now you can see ...
In conclusion the facts show that ...	In my introduction I referred to ...
Acknowledging then ...	Consequently ...
The explanations clearly show ...	By drawing together the information, a clearer understanding of ...
After all ...	

A frame to instruct

Introduction

First of all ...	To begin with ...
-------------------------	--------------------------

Starting with ...	This is how to ...
Begin by ...	The aim of these instructions is to ...
In order to ...	Having collected all the necessary ...

Second paragraph

Second(ly) ...	Following this ...
Now ...	The next step is ...
Using the (<i>material/resource</i>) ...	The first stage/step ...
Next ...	

Third paragraph

You now need ...	After ...
When you have ...	The next stage ...
As you ...	Once you have completed ...
Before you ...	Carefully ...

Fourth paragraph

At this stage you should ...	Then you ...
As a result of ...	You will see that ...
Measure ...	Continue ... until

Fifth paragraph

Last of all ...	Finally ...
Now is the time to ...	To complete the ...

Conclusion

To complete the ...	At the end of ...
I/we have found that ...	Now I/you have made ...
As a result of ...	I/we have discovered ...
I would recommend ...	The finished result should ...

BIBLIOGRAPHY

ENGLISH LANGUAGE

- 1.- Thomson, A.J. & Martinet, A.V. (1985) Third Edition. *A Practical English Grammar*. Oxford: Oxford University Press.
- 2.- Thomas, H. (2001). *Better English Made Easy*. New York: Greystone Press.
- 3.- Axelrod, R.B. & Cooper, C.R. (2002). *The St. Martin's Guide to Writing*. New York: St. Martin's Press.
- 4.- Tichy, H.J. (1976). *Effective Writing*. New York: John Wiley & Sons, Inc.
- 5.- Allen, J.P.B. & Widdowson, H.G. (1974). Oxford: Oxford University Press.
- 6.- Collocot, T.C. (1979). *Chambers. Diccionario Científico y Tecnológico*. Barcelona: Ediciones Omega.
- 7.- Merriam-Webster Inc. (1976). *Webster's Collegiate Thesaurus*. Springfield, Massachusetts: Merriam-Webster Inc. Publishers.
- 8.- Sinclair, J. (1993). *Collins Cobuild. English Usage*. London: Harper Collins Publishers.
- 9.- Hornby, A.S. (1985). *Oxford Advanced Learner's Dictionary of Current English*. Oxford: Oxford University Press.
- 10.- Finch, A.L. (2002) *Classroom English Phrases*.
<http://www.finchpark.com/courses/links/classroom.htm> (Date of access: February 2, 2009)
- 11.- BBC World Service (2008). *Teaching English*. <http://www.teachingenglish.org.uk/> (Date of access: February 2, 2009)
- 12.- Discovery Education (2007). *PuzzleMaker Online*.
<http://puzzlemaker.discoveryeducation.com/> (Date of access: February 2, 2009)
- 13.- English Raven Educational Services (2008). *OnlinEnglish*. www.englishraven.com (Date of access: February 28, 2009)
- 14.- Pearson Education(2007). *Funbrain*. <http://www.funbrain.com/> (Date of access: February 2, 2009)
- 15.- Educationalresources.co.uk. (2005). *The Educational Resources Site*.
<http://www.educationalresources.co.uk/> (Date of access: February 4, 2009)
- 16.- Enchanted Learning Software (2007). *Enchanted Learning*.
<http://www.enchantedlearning.com/Home.html> (Date of access: February 4, 2009)
- 17.- BBC (2008) www.bbc.co.uk (Date of access: February 4, 2009)
- 18.- Autorank Pro (2008). *SITES FOR TEACHERS*. <http://www.sitesforteachers.com/> (Date of access: February 4, 2009)
- 19.- Google Académico (2008) <http://scholar.google.es/> (Date of access: February 12, 2009)
- 20.- Internostrum (2006). *Sistema de traducció automàtica castellà-català*
<http://www.internostrum.com/> (Date of access: February 12, 2009)
- 21.- Instituto Cervantes (2008). *Servicio de Traducción Automática*.
<http://oesi.cervantes.es/traduccion.jsp> (Date of access: February 12, 2009)

SCIENTIFIC INFORMATION

Theory

- 1.- Goodman, S. and Sunley, C. (2005) Revision Guide. *GCSE Chemistry*. London: Harper Collins Publisher.
- 2.- Cartwright and others. *Key Stage 3. Science. National Strategy. Book 3*. Newcastle: Coordination Group Publications Ltd.
- 3.- *GCSE Chemistry. Complete Revision & Practice*. Newcastle: Coord. Group Publications Ltd.
- 4.- Brady, J. and Humiston, G. (1975) *General Chemistry. Principles & Structure*. New York: John Wiley & Sons, Inc.
- 5.- Masterton, W. and Slowinski, E. (1977) Fourth Edition. *Chemical Principles*. Philadelphia: W. B. Saunders Company.
- 6.- Neveggall, W.; Holtzclaw, H. and Robinson, W. (1980) Sixth Edition. *General Chemistry*. Massachusetts: D.C. Heath and Company.
- 7.- Majolero, M.; Bouzas, M.J.; Serra, S. I Compte, P. (2001): *Descobrim la matèria*. Barcelona: Editorial McGraw Hill..
- 8.- Caamaño, A.; Correig, M.T. (1996): *Tot canvia*. Paterna: Editorial Ecir.
- 9.- Warren, P. (1988). *Physics for Life*. London: John Murray Publishers.
- 10.- Abad, M^a Lluïsa i Ventura, Teresa (1998). *Els productes químics i els materials*. Barcelona: Editorial Claret.
- 11.- Allinger, N.L.; Cava, M.P.; de Jongh, D.C.; Johnson, C.R.; Level, N.A. y Stevens, C.L. (1991) Segunda Edición. *Química Orgánica*, Barcelon: Ed. Reverté.
- 12.- Caamaño, A.; Obach, D. i Pérez-Rendón, E. (2002) *Física 2 Primer Cicle*, Barcelona: Editorial Teide.
- 13.- Campbell, R.F.; Geffner, S.L.; Geissman, T.A.; Grenstadt, M.; Gruhn, C.; Haenisch, E.L.. (1982). *Química una Ciencia Experimental*. Barcelona: Editorial Reverté S.A.
- 14.- Albadalejo, E.; Caamaño, A.; Mayós, C.; Obach, D.; Pérez-Rendón, E. y Ventura T. (1988) *Química Faraday*. Barcelona: Ed. Teide.
- 15.- Albadalejo, E.; Caamaño, A.; Mayós, C.; Obach, D.; Pérez-Rendón, E. y Ventura, T. (1990) *Química Faraday. Guía del Profesor*. Barcelona: Ed. Teide.
- 16.- Marsal, A. i Saladrigas, O. (2007) *Física i Química 3r ESO*. Barcelona: Castellnou Edicions.
- 17.- Enciso, J.; Fernández, A. i Pérez, C. (2007) *Ciències de la Naturalesa. Física i Química 3*. Barcelona: McGraw-Hill/Interamericana de España.
- 18.- Duñach, M. i Masjuan, M. D. (2007) *Física i Química 3r ESO*. Barcelona: Editorial Casals.
- 19.- Gil, G.; Puente, J.; Remacha, M. i Viguera, J. A. (2007) *Ciències de la Naturalesa. Física i Química 3r ESO*. Barcelona: Editorial Cruïlla.
- 20.- Ros, I.; Bassetas, M.; Conesa, S. i Segura, M. (2007) *Ciències de la Naturalesa. Física i Química 3r ESO*. Barcelona: Editorial Barcanova.
- 21.- Ferrer, V.; García, M.; Lamora, A. i Navas, V. (2007) *Ciències de la Naturalesa. Física i Química 3r ESO*. Barcelona: Editorial Text-La Galera.

22.- Fontanet, A. i Martínez de Murgía, M.J. (2007). *Positró. Física i Química. Tercer Curs*. Barcelona: Ed. Vicens Vives.

Laboratory Experiments

23.- Smith, W. and Wood, J. (1966). Third Edition *Laboratory Manual for College Chemistry*. New York: Harper&Row Publishers.

24.- Weiss, G.; Wismer, R. and Greco, T. (1982). Third Edition. *Experiments in General Chemistry*. New York: Macmillan Publishing.

25.- Cromer, A. H. (1986). 2ª Edición. *Física para las Ciencias de la Vida*, Barcelona: Ed. Reverté.

26.- Davis, J.E.; MacNab, W.K.; Haenisch, E.L.; MacClellan, A.L. y O'Connor, P.R. (1975). *Manual de Laboratorio para Química: Experimentos y Teorías*. Barcelona: Editorial Reverté.

27.- Valle, S.: *Prácticas de Química*. Barcelona: Torrero y Mas.

28.- González, C. y Calama, M.A. (1980). *Prácticas de Química*. Madrid: SM ediciones.

29.- Paraira, M. (1981). *Laboratorio: Guía General de Prácticas de Química*. Barcelona: Hora S.A.

30.- Seba, E. y Roca, A.: *Atlas de prácticas de física y química*, ediciones Jover, Barcelona, 1988.

31.- Equipo Modelo En. 0901: *Manual de Prácticas de Química*, ENOSA, Madrid, 1973, Séptima Edición

32.- Campbell, R.F.; Geffner, S.L.; Geissman, T.A.; Grenstadt, M.; Gruhn, C.; Haenisch, E.L.. (1981). *Química una Ciencia Experimental. Manual de Laboratorio*. Barcelona: Editorial Reverté S.A.

33.- Swezey, Kenneth M. *Chemistry Magic*. New York: McGraw-Hill.

34.- Freeman, Mae and Freeman, Ira (1962). *Fun with Chemistry*. New York: Random House.

35.- *Curs de Treballs Pràctics de Química al Batxillerat*, Generalitat de Catalunya, Departament d'Ensenyament. Curs 2000-2001.

36.- *Pràctiques de Química. Ensenyament de Biologia*. Química General. Facultat de Química. Universitat de Barcelona.

37.- Martín Sánchez, M. T. y Martín Sánchez, M. (1982). *Prácticas de Química. Nivel "Enseñanza Media"*. Salamanca I.C.E. de Salamanca.

38.- Montaña Pedrero, A. i Urpí Tubella, F. (1995). *Introducció a l'Experimentació en Química Orgànica*. Barcelona: Publicacions de la Universitat de Barcelona.

39.- Weisbruch, Fred. (1951). *Lecture demonstration experiments for High School chemistry*. Saint Louis: Educational Publishers.

40.- Torra y Bitlloch, Imma (1992). 1ª Edició. *Reaccions químiques*. Barcelona: Generalitat de Catalunya, Departament d'Ensenyament.

41.- Duran, Xavier i Martínez, M. Dolors (1997). *El canvi químic*. L'Hospitalet de Llobregat: Editorial Proa.

42.- Bové, R. M.; Lluís, I.; Mateu, J.R.; Pérez-Espelt, M. (1998) *Petites investigacions*. Barcelona: Editorial Casals.

43.- Ramon, Jaume (1997) *El treball de laboratori químic*. Barcelona: Editorial Castellnou.

- 44.- Seba, E. y Roca, A. (1988). *Atlas de prácticas de física y química*. Barcelona: Ediciones Jover.
- 45.- Guerra, C. y Sotelo, H. (1979). 1ª Edición: *Manual de Laboratorio de Física para Maestros*. México: Editorial Trillas.
- 46.- Ortega, M. (1980). *Prácticas de Laboratorio de Física General*. Barcelona: Ediciones Marzo 80.
- 47.- Masterton, W. and Slowinski, E. (1977) Fourth Edition. *Chemical Principles*. Philadelphia: W. B. Saunders Company.
- 48.- Nevergall, W.; Holtzclaw, H. and Robinson, W. (1980) Sixth Edition. *General Chemistry*. Massachusetts: D.C. Heath and Company.

Websites

- 1.- The University of Sydney (2006) *The Periodic Table of the Elements*
http://alex.edfac.usyd.edu.au/methods/Science/periodic_table.html#on-line%20TRs (Date of access: February 2, 2009)
- 2.- Senese, F. (2005) *Foundations of Dalton's atomic theory*
<http://antoine.frostburg.edu/chem/senese/101/atoms/dalton-postulates.shtml> (Date of access: February 20, 2009)
- 3.- Senese, F. (2005) *The law of fixed composition. Quiz: Dalton's Atomic Theory*
<http://antoine.frostburg.edu/chem/senese/101/atoms/dalton-quiz.shtml> (Date of access: February 20, 2009)
- 4.- Senese, F. (2005) *Glossary*
<http://antoine.frostburg.edu/chem/senese/101/glossary/m.shtml> (Date of access: February 21, 2009)
- 5.- Universitat Politècnica de Catalunya. Servei de Biblioteques i Documentació. *EFFECTE HIVERNACLE* [http://bibliotecnica.upc.es/e-ambit/info/documents/GAD/Eupm/ehivern.htm#CFC%20\(Clorofluorocarbonis\)](http://bibliotecnica.upc.es/e-ambit/info/documents/GAD/Eupm/ehivern.htm#CFC%20(Clorofluorocarbonis)) (Date of access: February 21, 2009)
- 6.- *Vapor Pressure and Boiling Point* <http://boomeria.org/physicslectures/heat/vapor.html> (Date of access: February 21, 2009)
- 7.- Davenport University. (1995) *Chemistry Activities. Experiments*. Lapeer County, Michigan, USA <http://chem.lapeer.org/Chem1Docs/> (Date of access: February 21, 2009)
- 8.- Gornley, P. (1995) *Quantitative Analysis of Lead*. Lapeer County, Michigan, USA
<http://chem.lapeer.org/Chem1Docs/LeadAnal.html> (Date of access: February 22, 2009)
- 9.- Helmenstine, A.M. (2001) *Periodic Table of the Elements*. New York
<http://chemistry.about.com/library/blper5.htm> (Date of access: February 22, 2009)
- 10.- Helmenstine, A.M. (2001). *How Does Soap Clean*. New York.
<http://chemistry.about.com/library/weekly/aa081301a.htm> (Date of access: February 22, 2009)
- 11.- Helmenstine, A.M. (2001). *Acid-Base Indicators*. New York.
<http://chemistry.about.com/library/weekly/aa112201a.htm> (Date of access: February 22, 2009)
- 12.- Helmenstine, A.M. (2001). *Demonstrations & Experiments*. New York.
<http://chemistry.about.com/od/demonstrationsexperiments/> (Date of access: February 22, 2009)

- 13.- Encyclopaedia Britannica. <http://concise.britannica.com/ebc/article-9374130/organic-compound> (Date of access: February 24, 2009)
- 14.- Park, L.J. (1996) *Binary Compounds of Metals with Fixed Charges. Given Name, Write the Formula.* <http://dbhs.wvusd.k12.ca.us/webdocs/Nomenclature/Binary-Fixed-NametoFormula.html> (Date of access: February 25, 2009)
- 15.- Fancis, E. (1998) *Dalton's Atomic Theory.* <http://dl.clackamas.edu/ch104-04/dalton's.htm> (Date of access: February 24, 2009)
- 16.- Egging, S. (1998) *Nomenclature* <http://dl.clackamas.edu/ch105-05/nomencla.htm> (Date of access: February 25, 2009)
- 17.- Indiana University. *Building an Electromagnet* <http://dustbunny.physics.indiana.edu/~dzierba/Scidemo/Electromagnet.html> (Date of access: February 25, 2009)
- 18.- Brooks, D.W. (2002). *MicroScale.* University of Nebraska-Lincoln. <http://dwb.unl.edu/Chemistry/MicroScale/MScale00.html#MS01> (Date of access: February 25, 2009)
- 19.- Gagnon, S. *The Periodic Table of Elements* <http://education.jlab.org/itselemental/index.html> (Date of access: February 25, 2009)
- 20.- Wikipedia (2008). *Steam distillation.* http://en.wikipedia.org/wiki/Steam_Distillation (Data d'accés 6 de febrer de 2008)
- 21.- Wikipedia (2008). *Sulfuric Acid.* http://en.wikipedia.org/wiki/Sulphuric_acid#Manufacture (Date of access: February 26, 2009)
- 22.- Wikipedia (2008). *Van der Graaff Generator.* http://en.wikipedia.org/wiki/Van_de_Graaff_generator (Date of access: February 26, 2009)
- 23.- Harris, D. (1999). *Electrochemical Writing.* http://genchem.chem.wisc.edu/demonstrations/Analytical/pages/electrochem/electrochemical_writing.htm (Date of access: February 27, 2009)
- 24.- Shakhashiri, B.Z. *Slime* http://genchem.chem.wisc.edu/demonstrations/Gen_Chem_Pages/22organicpage/slime.htm (Date of access: February 27, 2009)
- 25.- Innovision-India (2006). *Man Made Organic Materials – Part I* http://home.att.net/~cat6a/org_mat-I.htm (Date of access: February 28, 2009)
- 26.- Firestone, R.B. (2001). *Information about the Periodic Table of the Isotopes.* <http://isotopes.lbl.gov/education/info.htm> (Date of access: February 28, 2009)
- 27.- Firestone, R.B. (2000). *The Berkeley Laboratory Isotopes Project's. Exploring the Table of Isotopes.* <http://isotopes.lbl.gov/education/isotopes.htm> (Date of access: February 28, 2009)
- 28.- American Chemical Society (2002). *Volumetric Flask. Movie* <http://jce.chem.divched.org/jcesoft/cca/CCA6/MAIN/1ChemLabMenu/Measuring/Volume/VolumetricFlask/MENU.HTM> (Date of access: March 2, 2009)
- 29.- American Chemical Society (2002). *Quantitative Preparation of a Solution with a Solid and Deionized. Movie Water* <http://jchemed.chem.wisc.edu/jcesoft/cca/CCA6/MAIN/1ChemLabMenu/Measuring/Volume/VolumetricFlask/PREPSOL/MENU.HTM> (Date of access: March 2, 2009)
- 30.- Ramos, J. (2008) *Gravimetric Analysis.* University of New York <http://jr.stryker.tripod.com/chemistry/formula.html> (Date of access: March 2, 2009)

- 31.- Vignault, J.P. (2008). *Chimie (3)*. Syracuse. France.
http://melusine.eu.org/syracuse/bbgraf/banque/chimie_03/ (Date of access: March 3, 2009)
- 32.- AOL Hometown (2005). *Balancing Chemical Equations*
<http://members.aol.com/profchm/balance.html> (Date of access: March 3, 2009)
- 33.- DARE Software (2008). *Sample Clip Art*. ARTARMON Australia
<http://members.optusnet.com.au/~daresoftware/authcpa.html> (Date of access: March 4, 2009)
- 34.- Guch, I. (1998). *The Six Types of Chemical Reaction*.
<http://misterguch.brinkster.net/6typesofchemicalrxn.html> (Date of access: March 6, 2009)
- 35.- Guch, I. (1998). *Mr. Guch Explains*. <http://misterguch.brinkster.net/explains2.html>)
(Date of access: March 6, 2009)
- 36.- Guch, I. (1998). *So, what's the deal with solutions?*
<http://misterguch.brinkster.net/molaritytutorial.html> (Date of access: March 7, 2009)
- 37.- Department of Chemistry, University of Oxford (2005) *Virtual Chemistry*
<http://neon.chem.ox.ac.uk/vrchemistry/default.html> (Date of access: March 8, 2009)
- 38.- Chemistry and Biochemistry Department (2003). *Lab Techniques*. University of Colorado
<http://orgchem.colorado.edu/hndbksupport/filt/filtration.html> (Date of access: March 9, 2009)
- 39.- Department of Energy (2003). *Aluminium*. University of California.
<http://periodic.lanl.gov/elements/13.html> (Date of access: March 12, 2009)
- 40.- *Simulation of distillation* <http://phys.free.fr/images/dist.gif> (Date of access: March 12, 2009)
- 41.- Oswego City School District Regents Exam Prep Center (2007). *Regents Prep: Chemistry Multiple-Choice Questions*
<http://regentsprep.org/regents/core/questions/questions.cfm?Course=CHEM&TopicCode=08> (Date of access: March 15, 2009)
- 42.- UniServe Connections (2006). *The Acidic Environment*. The University of Sydney. Australia. <http://science.uniserve.edu.au/school/curric/stage6/chem/acidenv.html> (Date of access: March 15, 2009)
- 43.- Villasuso Gato, J. (2007). *El electróforo*.
http://teleformacion.edu.aytolacoruna.es/FISICA/document/fisicalInteractiva/sacaleE_M2/Triboelectricidad/electroforo/electroforo.htm (Date of access: March 15, 2009).
- 44.- Gibson, D. (2000). *Metals, Nonmetals & Metalloids*.
<http://web.buddyproject.org/web017/web017/metals.html> (Date of access: March 16, 2009)
- 45.- University of Michigan (2006). *Van der Graaff Generator*.
<http://wlap.physics.lsa.umich.edu/cern/lectures/academ/2000/wilson/01/real/sld007.htm>
(Date of access: March 16, 2009)
- 46.- Yoder, C. (2007). *The Wired Chemist*. <http://wulfenite.fandm.edu/Sela/Mole/method.htm>
(Date of access: March 17, 2009)
- 47.- Carroll, G.L. (2002). *The Chemistry of Everyday Things*.
http://www.4sbccfaculty.org/lecture/90s/lectures/Gary_Carroll.htm (Date of access: March 18, 2009)
- 48.- Boudreaux, K.A. (2008). *Sodium + Chlorine: Pass the Salt, Please*. Angelo State University. San Angelo, Texas
http://www.angelo.edu/faculty/kboudrea/demos/sodium_chlorine/sodium_chlorine.htm
(Date of access: March 19, 2009)
- 49.- AUS-e-TUTE Centre (2008). *Summary of Radioactivity: Properties and Uses*
<http://www.ausetute.com.au/nucleum.html> (Date of access: March 19, 2009)

- 50.- BBC (2008). *Chemistry Useful products from oil*.
http://www.bbc.co.uk/schools/gcsebitesize/chemistry/usefulproductsoil/oil_and_oilproductsrev5.shtml (Date of access: March 20, 2009)
- 51.- Szaflarski, D.; Dean, R. And Dean, M. (2008). *Modern Uses of Radioactive Isotopes*. University of California, San Diego
http://www.chem.duke.edu/~jds/cruise_chem/nuclear/uses.html (Date of access: March 20, 2009)
- 52.- *Directional characteristics of s, p and d orbitals*.
<http://www.gly.uga.edu/schroeder/geol6550/electronshapes.gif> (Date of access: March 2, 2009)
- 53.- Department of Chemistry. University of Wisconsin-Madison (2008). *Filtration*.
<http://www.chem.wisc.edu/areas/organic/orglab/tech/filtration.htm> (Data d'accés 21 de febrer de 2008)
- 54.- ChemBuddy (2005). *Definition of mass percentage*.
<http://www.chembuddy.com/?left=concentration&right=mass-percentage> (Date of access: March 22, 2009)
- 55.- Chemical Days (2008). *When the lipstick gets smeared*.
<http://www.chemicaldays.com/visArtikel.asp?artikelID=199> Date of access: March 22, 2009)
- 56.- Department of Chemistry (1997). *Microscale Laboratory Techniques*. University of Michigan.
<http://www.chemistry.mcmaster.ca/~chem2o6/labmanual/microscale/microscale.html> (Date of access: March 23, 2009)
- 57.- Department of Chemistry (2005). *Chemical Hazards*. National University of Singapore.
<http://www.chemistry.nus.edu.sg/PSSO/Safety/ChmHazard.htm> (Date of access: March 23, 2009)
- 58.- Chemtutor (2005). *Reactions*. <http://www.chemtutor.com/react.htm> (Date of access: March 24, 2009)
- 59.- Vargas, M. (2008). *Un simple generador Van de Graaff*.
<http://www.cienciafacil.com/vdg.html> (Date of access: March 24, 2009)
- 60.- Phillips, W.D. (1999). *Using a multimeter*. <http://www.doctrionics.co.uk/meter.htm> (Date of access: March 25, 2009)
- 61.- EMF (2008). *Magnetic Fields*. http://www.emfs.info/what_MagFields.asp (Date of access: March 25, 2009)
- 62.- ExploreLearning (2008). *Exploration Guide: Advanced Circuits*
<http://www.explorelearning.com/index.cfm?method=cResource.dspExpGuide&ResourceID=509> (Date of access: March 26, 2009)
- 63.- Fact Monster (2007). *Mixture*. Pearson Education.
<http://www.factmonster.com/ce6/sci/A0833482.html> (Date of access: March 27, 2009)
- 64.- Kuphaldt, T.R. (2003). *Lessons In Electric Circuits*.
http://www.faqs.org/docs/electric/Exper/EXP_2.html (Date of access: March 28, 2009)
- 65.- Fisicanet (2008). *ELECTROQUIMICA, ELECTROLISIS Y PILAS*.
http://www.fisicanet.com.ar/monografias/monograficos2/es14_electroquimica.php (Date of access: March 29, 2009)
- 66.- Carboni, G. (1988). *EXPERIMENTS IN ELECTROCHEMISTRY*.
http://www.funsci.com/fun3_en/electro/electro.htm (Date of access: March 29, 2009)
- 67.- France, C. (2007). *Electric Bell*. <http://www.gcscience.com/pme6.htm> (Date of access: March 31, 2009)

- 68.- Harris, R. & Doody, K. (2004). *Internet Tests*.
<http://www.glenbrook.k12.il.us/gbssci/chem/chem173/internettest/index.htm> (Date of access: April 1, 2009)
- 69.- Clark, B. (2005). *GENERAL SCIENCE*. William Penn High School, Philadelphia.
<http://www.gutenberg.org/files/16593/16593-h/16593-h.htm> (Date of access: April 1, 2009)
- 70.- Hydrogen Now (2002). *Other Uses of Hydrogen*.
<http://www.hydrogennow.org/Facts/OtherUsesOfHydrogen.htm> (Date of access: April 2, 2009)
- 71.- Scagliarini, A. (2004). *Progetto Multilab. Celle fotovoltaiche* <http://www.itis-molinari.mi.it/studenti/progetti/multilab/energia.html> (Date of access: April 2, 2009)
- 72.- The Indiana University Cyclotron Facility (2008). *Quick Facts. The atom*.
<http://www.iucf.indiana.edu/education/quickfacts.php> (Date of access: April 2, 2009)
- 73.- Kidzworld.com, Inc., (2007). *The Periodic Table of Elements*.
<http://www.kidzworld.com/site/p2066.htm> (Date of access: April 2, 2009)
- 74.- Childs, A. & Garrett, R. *History of atomic theory A lesson plan for Grades 9–12 Physical Science*. <http://www.learnnc.org/lessons/annachilds1142004055#supplemental> (Date of access: April 4, 2009) (*didàctica química* CLIL)
- 75.- Lenntech Water treatment & air purification (2008). *Periodic chart of elements*.
<http://www.lenntech.com/periodic-chart.htm> (Date of access: April 4, 2009)
- 76.- Simanek, D.E. (1999). *THE DANGERS OF ANALOGIES*.
<http://www.lhup.edu/~DSIMANEK/scenario/analogy.htm> (Date of access: April 4, 2009)
- 77.- Torrone, P. (2006). *Make Technology on your time*.
<http://www.makezine.com/blog/archive/2006/06/> (Date of access: April 5, 2009)
- 78.- Franklin, T. (2005). *Gee Whiz Science Home Page*.
<http://www.meigsmagnet.org/~franklint/geewhiz.html#Demonstrations> (Date of access: April 5, 2009)
- 79.- Leach, M.R.(2008). *Gases, Liquids, Solids and the Phase Interaction Matrix*.
http://www.meta-synthesis.com/webbook/24_complexity/complexity3.html#GLS (Date of access: April 6, 2009)
- 80.- Leach, M.R.(2008). *The Classification of Matter*. http://www.meta-synthesis.com/webbook/31_matter/matter.html (Date of access: April 7, 2009).
- 81.- MiniScience.com. (2008) *Science Project Idea. Make Electricity From Saltwater*.
<http://www.miniscience.com/link/Airbattery.htm> (Date of access: April 8, 2009).
- 82.- Ekeh, I.; Fritz, E.; Panno, N. & Schwab, B. (2004). *Electromagnet*.
<http://www.mne.psu.edu/me415/fall04/NorGrumB/magnet.html> (Date of access: April 10, 2009)
- 83.- Gerrero, I. (2005). *La pila o batería (Pila casera)*.
<http://www.monografias.com/trabajos26/la-pila/la-pila.shtml> (Date of access: April 11, 2009)
- 84.- MPower Solutions Ltd (2005). *Cell Chemistries*.
<http://www.mpoweruk.com/chemistries.htm> (Date of access: April 12, 2009).
- 85.- Thornes, N. (2008). *Reactions*.
<http://www.nelsonthornes.com/secondary/science/scinet/scinet/reaction/indust/h2so4.htm> (Date of access: April 13, 2009)
- 86.- NCS.org (2002). *Major Uses of Radioisotopes*.
<http://www.nsc.org/issues/rad/isotopes.htm> (Date of access: April 14, 2009)

- 87.- Nanyang Technological University (2008). *Chemical Formulae and Equations Exercise*. Singapore. <http://www.ntu.edu.sg/home5/PS7706005G/ChemFormulaEx.htm> (Date of access: April 15, 2009)
- 88.- Cucinotta, A. (2002). *THE LAWS OF THE PHYSICAL WORLD*. <http://www.peoplephysics.com/physics-laws8.htm> (Date of access: April 16, 2009)
- 89.- Department of Physics (2008). *Magnetic Fields: Magnetic Fields & Forces*. University of North Texas. http://www.phys.unt.edu/~klittler/demo_room/e&m_demos/5h10_30.html (Date of access: April 17, 2009)
- 90.- Montana State University (2006). *MAGNETIC FIELDS AROUND BAR MAGNETS*. http://www.physics.montana.edu/demonstrations/video/5_electricityandmagnetism/demo/magneticfieldsaroundbarmagnets.html (Date of access: April 18, 2009)
- 91.- The Nuffield Foundation (2004). *Expansion of a gas at constant pressure*. [http://www.practicalphysics.org/go/print/Experiment_556.html;jsessionid=agHSX3Yq0Skd?topic_id=\\$parameters.topic_id&collection_id=79](http://www.practicalphysics.org/go/print/Experiment_556.html;jsessionid=agHSX3Yq0Skd?topic_id=$parameters.topic_id&collection_id=79) (Date of access: April 19, 2009)
- 92.- University of Michigan (2008). *Analysis of Mr. Sketch Ink by Paper Chromatography*. <http://www.reachoutmichigan.org/funexperiments/quick/csustan/mrsketch.htm> (Date of access: April 19, 2009)
- 93.- Clarkson, R. (2006). *The Dehydration of Ethanol*. <http://www.rjclarkson.demon.co.uk/junior/dehydrethanol.htm> (Date of access: April 20, 2009)
- 94.- The Open Door Team (2008). *The Properties of Gases*. <http://www.saburchill.com/chemistry/chapters/chap047.html> (Date of access: April 21, 2009).
- 95.- Kurtus, R. (2004). *Detection of a Magnetic Field*. http://www.school-for-champions.com/science/magnetic_detection.htm (Date of access: April 22, 2009)
- 96.- Pearson Canada. *HotLinks*. <http://www.scienceman.com/science10/pgs/unit1.html> (Date of access: April 24, 2009).
- 97.- Wallingford, A. (2004) *How To... Lab Safety Techniques*. http://www.sciencetoolbox.com/articles/article_09-28-04.html (Date of access: April 25, 2009)
- 98.- The Fu Foundation School of Engineering & Applied Science. (2008) *MICROCOSMOS: FROM LEUCIPPUS TO YUKAWA*. Columbia University, New York <http://www.seas.columbia.edu/~ah297/un-esa/universe/universe-chapter3.html> (Date of access: April 26, 2009)
- 99.- The Shodor Education Foundation (1998) *Acid-Base Chemistry*. North Carolina <http://www.shodor.org/unchem/basic/ab/> (Data d'accés 15 de març de 2008)
- 100.- Tiscali (2008) *Encyclopaedia*. <http://www.tiscali.co.uk/reference/encyclopaedia/> (Date of access: April 27, 2009)
- 101.- Fernández Baeza, J. (2005) *Prácticas de Laboratorio*. Universidad de Castilla-La Mancha http://www.uclm.es/profesorado/jfbaeza/practicas_de_laboratorio.htm (Date of access: April 29, 2009)
- 102.- Climent, M.T. (2007) *Química a microescala per a laboratoris docents*. Universitat de València. <http://www.uv.es/tcliment/English/micro.htm> (Date of access: April 30, 2009)
- 103.- Carpi, A. (2003) *Acids and Bases: An Introduction*. British Columbia http://www.visionlearning.com/library/module_viewer.php?mid=58 (Date of access: May 2, 2009).
- 104.- Walter Fendt (1997). *Ohm's Law*. <http://www.walter-fendt.de/ph11e/ohmslaw.htm> (Date of access: May 2, 2009).

- 105.-** University of Michigan (2003). *Metals, Nonmetals, & Metalloids*.
<http://www.windows.ucar.edu/tour/link=earth/geology/metals.html&edu=high> (Date of access: May 3, 2009)
- 106.-** Danish Wind Industry Association. (1997) *Electromagnetism*.
<http://www.windpower.org/en/stat/emag/emagn.htm> (Date of access: May 4, 2009).
- 107.-** Doc Brown. *Doc Brown Chemistry Clinic*. London
<http://www.wpbschoolhouse.btinternet.co.uk/> (Date of access: May 5, 2009)
- 108.-** LoveToKnow Corp. (1996) *YourDictionary.com*. <http://www.yourdictionary.com/> (Date of access: May 6, 2009)
- 109.-** Electricity Generation <http://zebu.uoregon.edu/1999/ph161/l3.html> (Date of access: May 7, 2009)
- 110.-** Gagnon, S. (2008) *Jefferson Lab. Science Education*. <http://education.jlab.org/> (Date of access: May 8, 2009)
- 111.-** ScienceMan.ca (2008). *ScienceMan's Featured Videos of the Day*.
<http://www.scienceman.com> (Date of access: May 10, 2009)
- 112.-** Henderson, T. (2007). *The Physics Classroom Tutorial*.
<http://www.glenbrook.k12.il.us/gbssci/Phys/Class/BBoard.html> (Date of access: May 12, 2009)
- 113.-** (2003). *La celda de Benard. Experimentos de física y química para hacer en casa*.
<http://www.geocities.com/petersonpipe/puedefallar/puede5.html#top> (Date of access: May 13, 2009)
- 114.- (2002)** *La celda de Benard. Ciencia en Imágenes. Una colección de videos educativos de corta duración*. <http://www.geocities.com/puedefallar/index.html> (Date of access: May 14, 2009).
- 115.-** Rodríguez Sánchez, A. y Rodríguez Sánchez, R. (2002). *Física*.
<http://www.mitareanet.com/fisica1.htm> (Date of access: May 15, 2009)
- 116.-** Saunders, B. (2008). *THE PHYSICS SUPERMARKET*. <http://www.hsphys.com/> (Date of access: May 17, 2009)
- 117.-** Varela, A. (2000). *Ciencianet. Experimentos*. <http://ciencianet.com/experimentos.html> (Date of access: May 17, 2009)
- 118.-** Intel Corporation (2005). *Learning and Teaching Technology*
<http://lqfl.skool.co.uk/keystage4.aspx?id=316> (Date of access: May 18, 2009).
- 119.-** GCSE Physics school textbook: Physics for You (2008). Free PowerPoints for use with *Physics for You*. <http://www.timetabler.com/physics4u/4Ufreepowerpoints.html> (Date of access: May 19, 2009)
- 120.-** Fordham Preparatory School (2004). *Science Help Online Chemistry. Review*.
<http://www.fordhamprep.org/qcurran/sho/sho/review/revindex.htm> (Date of access: May 20, 2009).
- 121.-** Chemistry and you (2008). *Physical and Chemical Changes*.
http://www.saskschools.ca/curr_content/science9/chemistry/lesson8.html (Date of access: May 21, 2009).
- 122.-** BBC (2008). *Chemical Reactions*.
<http://www.bbc.co.uk/schools/gcsebitesize/chemistry/chemicalreactions/3reversiblereactionsrev2.shtml> (Date of access: May 22, 2009).